UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,162	09/12/2003	Kenneth H. Heffner	N.C. 75463	1535

7590 09/25/2007

Darrell E. Hollis, SPLe-4
Strategic Systems Programs
Suite 1000
2521 South Clark Street
Arlington, VA 22202-3930

EXAMINER	
CHEN, BRET P	
ART UNIT	**PAPER NUMBER**
1762	
MAIL DATE	**DELIVERY MODE**
09/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/662,162	HEFFNER ET AL.	
	Examiner	Art Unit	
	B. Chen	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) *1-4 and 6* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *5 and 7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-7 are pending in this application, which is an RCE of Serial Number 10/662162.

Election/Restrictions

Applicant's election of claims 5, 7 in the reply filed on 9/4/07 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 1-4, 6 are withdrawn from consideration as being directed to a nonelected invention.

Specification

Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:
(1) if a machine or apparatus, its organization and operation;
(2) if an article, its method of making;
(3) if a chemical compound, its identity and use;
(4) if a mixture, its ingredients;
(5) **if a process, the steps**.

Extensive mechanical and design details of apparatus should not be given.

It is noted that the claimed invention is directed to a method. The examiner suggests amending the abstract to reflect same.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

It is noted that the claimed invention is directed solely to a method. The examiner suggests amending the title to reflect same.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 7 line 4, the phrase "striking carbon atoms that are on the electrically conductive surface" lacks antecedent basis and/or is confusing as to what carbon atoms are on the surface. Clarification and appropriate amendments are requested.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimock et al. (5,635,245) in view of Deutchman et al. (4,992,298) and vice versa. Kimock discloses a method of forming a diamond-like carbon coating with superior abrasion wear resistance and reduced chemical reactivity on a substrate by bombarding a substrate with energetic gas ions to sputter-etch the substrate surface and then chemically vapor depositing the coating on the substrate (col.3 lines 1-39). The diamond-like carbon layer 3 can be formed by a variety of processes including dual ion beam deposition (col.2 lines 1-29) and may contain copper (col.9 line 34- col.10 line 14). However, the reference does not specifically teach simultaneously ion accelerating.

Deutchman discloses a dual ion beam method for forming a diamond film onto a substrate, which comprises the steps of cleaning the surface of the substrate with a first energy beam of inert atoms; depositing a layer of a desired non-hydrocarbon substance on the substrate with a low energy, sputtered atomic beam; simultaneously exposing the substrate to said first energy beam of inert atoms with a high energy to grow a ballistically alloyed layer having a thickness of about 10-2000 A; and reducing the energy level of the first, high energy beam to

cause the growth of the layer of said substance on said substrate to a final desired thickness (col.2 lines 13-24).

It is noted that Kimock specifically teaches that dual ion beam deposition can be utilized to form the diamond-like layer. Deutchman specifically teaches a dual ion beam process which simultaneously injects two beams. It would have been obvious to incorporate the dual ion beam process of Deutchman in Kimock's process with the expectation of obtaining similar results.

In addition, it would have been obvious to utilize the materials of Kimock in Deutchman's process with the expectation of success.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Deutchman et al. (4,992,298). Deutchman discloses a dual ion beam method for forming a diamond film onto a substrate, which comprises the steps of cleaning the surface of the substrate with a first energy beam of inert atoms; depositing a layer of a desired non-hydrocarbon substance on the substrate with a low energy, sputtered atomic beam; simultaneously exposing the substrate to said first energy beam of inert atoms with a high energy to grow a ballistically alloyed layer having a thickness of about 10-2000 A; and reducing the energy level of the first, high energy beam to cause the growth of the layer of said substance on said substrate to a final desired thickness (col.2 lines 13-24). Specifically, first ion beam 28 strikes a sputtering target 31 made of graphite which produces a sputtered beam 32 to from a thin layer on substrate 16 (col.3 lines 48-66 and the Figure). Simultaneously, ion beam 18 strikes the substrate 16 to grow a ballistically alloyed layer (col.4 lines 4-34 and the Figure). The ion beams have a variety of energy levels and current densities (col.3 line 48 – col.4 line 53). It is noted that a wide variety of substrates are

disclosed including metals (col.4 lines 66-67). However, the reference fails to teach a diamond-like carbon source.

It is noted that the reference clearly teaches the use of a carbon source (col.3 lines 52-54) which produces sputtered carbon (col.4 line 11). One skilled in the art would realize that a diamond-like source is a specific carbon source. It would have been obvious to utilize a diamond-like source with the expectation of obtaining similar results.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to B. Chen whose telephone number is (571) 272-1417. The examiner can normally be reached on 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Bc
9/22/07

BRET CHEN
PRIMARY EXAMINER